COMPARISON ON THE SEAGRASS COMMUNITY AT THE THREE SITES NEAR DAWEI, TANINTHARYI REGION, MYANMAR

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Abstract

The seagrass meadows, three sites namely, Wa Maw Aw, Myin Khyar Aw and Ta Yaw Kam (North Bay) in the Dawei Township, Tanintharyi Division, were studied during December, 2018. A total of 5 species of seagrasses were recorded including *Cymodocea rotundata, Halodule uninervis, Halophila decipiens, H. ovalis* and *Syringodium isoetifolium* from the study areas. The dominant seagrass species of Wa Maw Aw was *Halophila ovalis*; *Halophila decipiens* in Myin Khyar Aw and *Cymodocea rotundata* in Ta Yaw Kam. Four species of seagrass were observed in Ta Yaw Kam however two species in Wa Maw Aw and only one species in Myint Khar Aw. The highest percentage coverage, 53.75% was observed at Wa Maw Aw however the lowest was at Myin Khyar Aw with 35.28% whereas Ta Yaw Kam with 44.56%. At Ta Yaw Kam, the seagrass biomass, most wet weight 11.31 gm wet. wt m^{-2} (Above ground) and 46.59 gm wet.wt.m^{-2} (Below ground) and the most dry weight of seagrass 3.28 gm dry.wt m^{-2} (Above ground) and 21.47 gm dry.wt m^{-2} were found in the below ground due to the abundance of *Cymodocea rotundata.* However the lowest wet weight (0.59 gm wet. wt m^{-2}) in the above ground and dry weight (0.32 gm dry. wt m^{-2}) in the above ground were observed at Myin Khyar Aw d ue to *Halophila decipiens*. The highest sand-muddy 98.67% was found in Wa Maw Aw but the lowest 90.67% in Myin Khyar Aw. The most transparency 6.10 m was recorded in Wa Maw Aw however the lowest one 2.3 m in Myin Khyar Aw.

Keywords: Diversity, dominant, highest, lowest and seagrass.

Introduction

Seagrass meadows play a significant role in the processes and resources of near shore coastal ecosystems, as they have physical, chemical and biological effects on habitats. Many fish and shellfish species, including those of commercial interest, are attracted to seagrass habitats for foraging and shelter, especially during their juvenile life stages (Gullström *et al*. 2002). Eleven species of seagrasses have been described in Myanmar (Soe-Htun *et al*. 2017). Seagrasses grow in soft sediments, from the low water mark to the depths of about 3-5 m and are inhabited by a rich associated biota.

Seagrass meadows are valuable habitats having economic and ecological importance in coastal ecosystem. Seagrasses represent one of the important and highly productive ecosystems of the world, which supports a variety of life forms ranging from microbes to marine mammals like dugongs. The objectives of this research are 1) to identify the morphotaxonomy of seagrass species in study areas; 2) to know biodiversity of seagrass; 3) to understand the abundance and distribution of seagrass; 4) to recognize the coverage of seagrass and biomass; 5) to know the different types of soil texture that growing the seagrass in the study areas.

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Materials and Methods

Seagrasses sample were collected from 3 study sites (Ta Yaw Kam at Lat 13° 40' 45.803" N, Long 98° 7' 34.630" E; Wa Maw Aw at Lat 13° 38' 1.994" N, Long 98° 7' 9.643" E; Myin Khyar Aw at Lat 13° 32' 56.588" N, Long 98° 8' 49.594" E) by uprooting the seagrasses with a small trowel During December, 2018 (Fig. 1). The collections were initially washed, cleaned and preserved in 5% formalin in seawater. Samples of seagrasses were examined mainly on the vegetative characters with a dissecting microscope, and then pressed on herbarium sheets to prepare as voucher specimens for each locality. Moreover, some water parameters namely, temperature, salinity, pH and transparency were measured in the field. This study has followed the SeagrassNet protocol (2006), consisting of three fixed, parallel, 50 m cross-transects referred to as cross-transects A, B and C, with cross-transect A closest to shore and C most seaward; B, midpoint of these cross-transects were established on a transect laid out seaward, perpendicular to the shore. In addition, the soil texture (clay, silt and sand- muddy) were also measured.

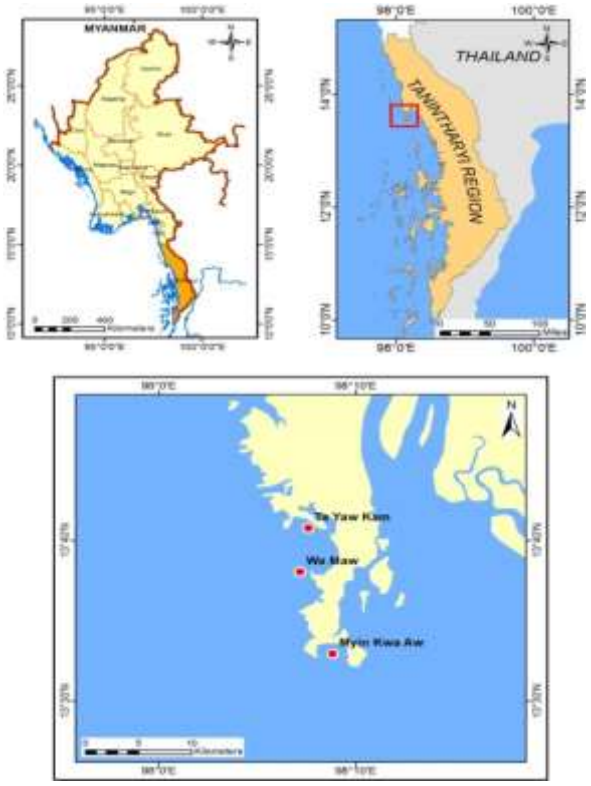


Figure 1 Map showing the survey sites of seagrasses in Dawei Township, Tanintharyi Region.

Results

A total of five species belonging to four genera from two families of seagrasses are collected from three stations in the Dawei. These are *Cymodocea rotundata*, *Halodule uninervis*, *Syringodium isoetifolium*, *Halophila decipiens* and *H. ovalis*. *C. rotundata* is the most dominant species in Ta Yaw Kam however *H. ovalis* is the most abundant species in Wa Maw Aw and *H. decipiens* is only dominant in Myin Khyar Aw. Four species, *C. rotundata*, *S. isoetifolium*, *Halodule uninervis* and *Halophila ovalis* are observed in Ta Yaw Kam but only one species is found in Myin Khyar Aw and two species, *Halophila ovalis* and *Halodule uninervis* are distributed in Wa Maw Aw (Fig. 2).

1. Coverage of seagrass

In Ta Yaw Kam Station showed in the average percentage coverage of seagrass 44.56%. Among four species, *C. rotudata* 34.66% is most commonly observed in this station. In Wa Maw Aw Station recorded the average coverage of seagrass 53.75%. In this station, *Halophila ovalis* 47.65% is dominantly found. However, the average coverage of seagrass 35.28% is observed in Myin Khyar Aw Station. In this station, one specific species, *Halophila decipiens* 35.28% is dominantly recorded.

2. Biomass of seagrass

The biomass of seagrass was measured as two parts, above ground (photosynthesis part) and below ground (non-photosynthesis part). It displays the variation of the wet weight in above-ground (5.59-16.58 gm wet.wt m^{-2}) and below-ground (36.05-65.93 gm wet.wt m^{-2}) of Ta Yaw Kam however above-ground (5.4-18.89 gm wet.wt m^{-2}) and below-ground (18.7-78.08 gm wet.wt m^{-2}) in Wa Maw Aw; above-ground (0.19-1.18 gm wet.wt m^{-2}) and below-ground (1.35-4.11 gm wet.wt m^{-2}) in Myin Khyar Aw.

Although, the above-ground biomass of seagrass in the dry weight range the above-ground (0.77-4.82 gm dry.wt m^{-2}) and below-ground (16.58-30.66 gm dry.wt m^{-2}) in Ta Yaw Kam; above-ground (0.58-5.4 gm dry.wt m^{-2}) and below-ground (2.32-22.17 gm dry.wt m^{-2}) in Wa Maw Aw however above-ground (0.19-0.39 gm dry.wt m^{-2}) and below-ground (0.25-0.79 gm dry.wt m^{-2}) in Myin Khyar Aw are found (Figs. 3-4).

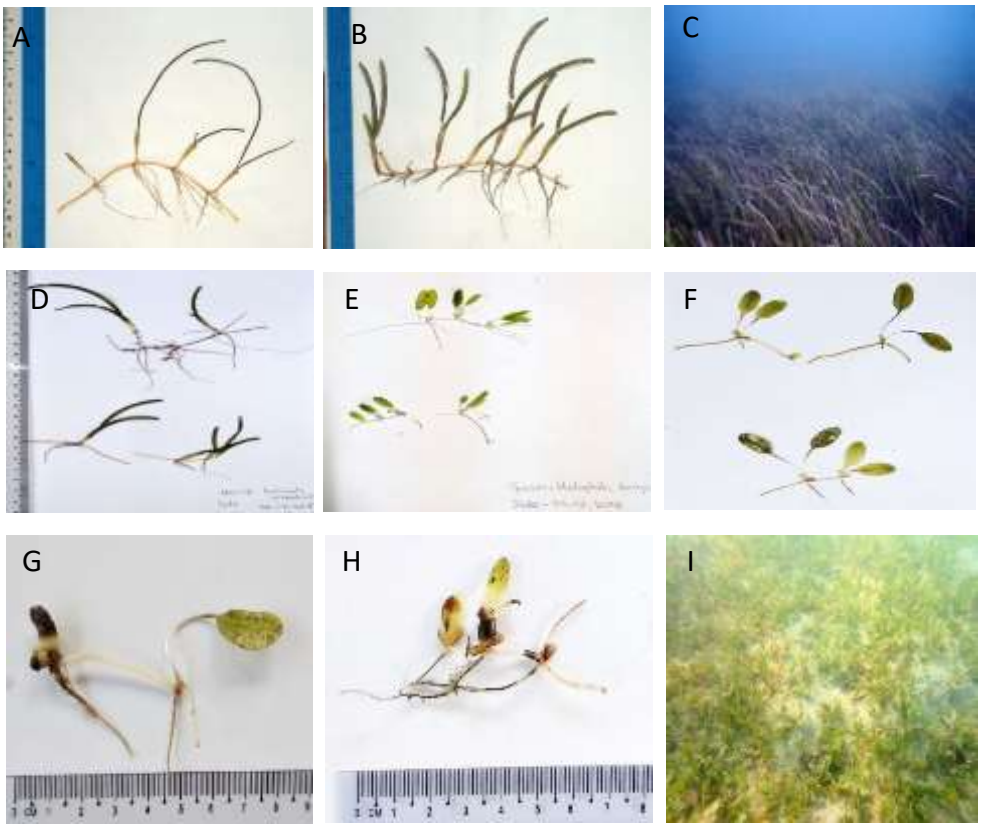


Figure 2 A-I) A) *Syringodium isoetifolium* (Ascherson) Danty; B) *Cymodocea rotundata* Ehrenberg et Hemprich ex Ascherson; C) Meadow of *C. rotundata*; D) *Halodule uninervis* (Forsskal) Ascherson; E) *Halophila decipiens* Ostenfeld; F) *Halophila ovalis;* G and H) The seed of *H ovalis*; I) Meadow of *H ovalis*.

The seed of *Halophila ovalis* is observed in Wa Maw Aw. Seagrass grow in a range of sediment types and depend on several abiotic factors. The more clay (1.67%) and silt (7.67%) are observed in Myin Khyar Aw than the other stations. The most sand-muddy (98.67%) is found in Wa Maw Aw among them.

Moreover some water parameters of Ta Yaw Kam are recorded as temperature 28°C, salinity 32‰, transparency 4.88m, pH 5.3; Wa Maw Aw with temperature 30°C, salinity 32‰, transparency 6.10m, pH 5.2 and Myin Khyar Aw with temperature 31°C, salinity 30‰, transparency 2.3m, and pH 5.7.

Discussion

In the present study, the number of seagrass species (5 species) was found in the Dawei including of three stations namely, Ta Yaw Kam, Wa Maw Aw and Myin Khyar Aw. Among 5 species, only 4 species, *Syringodium isoetifolium, Cymodocea rotudata, Halodule uninervis* and *Halophila ovalis,* were found in Ta Yaw Kam and 2 species, *H. uninervis, H. ovalis* in Wa Maw Aw; only one species, *Halophila decipiens* in Myin Khyar Aw (Fig. 2).

In comparison, the most percentage covers of seagrass recorded in this study were 53.75% in Wa Maw Aw however lowest 35.28% in Myin Khyar Aw. *C. rotudata* 34.66% was most commonly observed in Ta Yaw Kam Station however *H. ovalis* 47.65% was dominantly found in Wa Maw Aw Station and *H. decipiens* 35.28% was dominantly recorded in Myin Khyar Aw Station.

In Ta Yaw Kam Station, *C. rotudata* was most abundance at 3 cross transects but *H. uninervis* was not observed at transect C line. In Wa Maw Aw Station, *H. ovalis* was the most abundant at all transects but *H. uninervis* was the most dominant at the transect C line. In Myin Khyar Aw Station, *H. decipiens* was common observed at all transects (Fig. 5). Seagrasses growing in Wa Maw Aw was associated with the seaweed species, *Padina.* In Ta Yaw Kam Station, the seagrass bed was observed together with *Dictyota* and *Padina*.

The most wet weight of seagrass (65.93 gm wet.wt m^{-2}) and the most dry weight of seagrass (30.66 gm dry.wt m^{-2}) were found in the below ground at Ta Yaw Kam however the lowest wet weight and dry weight (0.19 gm wet.wt m^{-2}) in the above ground at Myin Khyar Aw (Figs. 3-4). Because of the size of plant was larger in Ta Yaw Kam than Myin Khyar Aw′specimens.

In the present study, the most transparency 6.10 m was recorded in Wa Maw Aw however the lowest 2.3 m in Myin Khyar Aw. Moreover the most temperature 31 °C was observed in Myin Khyar Aw however the lowest 28 °C in Ta Yaw Kam. The salinity was observed as 32 ‰ in both Ta Yaw Kam and Wa Maw Aw Yaw Kam however 30 ‰ was found in Myin Khyar Aw. The most value of pH 5.7 was observed in Myin Khyar Aw but the lowest 5.2 in Wa Maw Aw.

In the present study, the sediment types of seagrass, the most clay 1.67 % and the most silt 7.67% were observed in Myin Khyar Aw however the lowest 0.67% in Wa Maw Aw. The highest sand-muddy 98.67% was found in Wa Maw Aw but the lowest 90.67% in Myin Khyar Aw. In the present study, there were the difference types of habitats of seagrasses: the intertidal habitats of the rocky and sandy platforms at Wa Maw Aw however no the rocky in Ta Yaw Kam. In the present study, the substrate types of seagrasses between Myin Khyar Aw where more clay & silt and Wa Maw Aw where more sand, were also found to be differed with seagrass meadows in the Dawei, Tanintharyi Coastal Region of Myanmar.

Gullström *et al*. (2002) reported *Halophila ovalis, Cymodocea rotundata, Cymodocea serrulata, Syringodium isoetifolium* were very common in the Western Indian Ocean. This result was similar to the present study. Hemminga and Duarte (2000) described the decline in seagrass species richness with increasing silt content in South East Asian seagrass meadows. This result

was similar to the present study. Soe-Htun *et al*. (2001) described the total of nine species of seagrasses from the three coastal regions of Myanmar and the more species than the present result.

Soe-Htun *et al*. (2009) described *C. rotundata* distributed only in the Tanintharyi Coastal Region. This result was similar to the present study. Prathep (2010) reported the five species of seagrass found at Koh Tha Rai: *Enhalus acoroides, C. rotundata, Thalassia hemprichii, H. ovalis* and *H. uninervis*. This result was a little similar to the present study. Pierre (2012) described the dominant species for the Ifaty sites were *S. isotifolium* and *T. hemprichii* however Ta Yaw Kam was dominated by *C. rotundata* and Wa Maw Aw with *H. ovalis.*

Osathanunkul *et al*. (2015) described *Halophila ovalis* obtained from Tungkhen Bay, Phuket Province, Thailand and this result was similar to the present study. Soe-Htun *et al*. (2017) described 11 species of seagrasses were recorded from the Myeik Archipelago and Rakhine Coastal Areas however 5 species were observed in the present study. Moe Lwin Lwin *et al*. (2019) described *C. rotundata* was dominant species in Bo Cho Island and Nyaung Pin Aw. This result was similar to the present study.

Govindasamy *et al*. (2013) described the dominant seagrass species of Palk Bay, Bay of Bengal, India was *S. isoetifolium* and this result was similar to the present study. De la Torre-Castro (2006) described the seagrass meadows provide social ecological resilience. The goods and services associated with seagrass ecosystems and also appreciated by locals were fishing.

Management actions should be required ensuring these habitats are not lost for the sustainable development of fishery. The current study was allowed for long-term

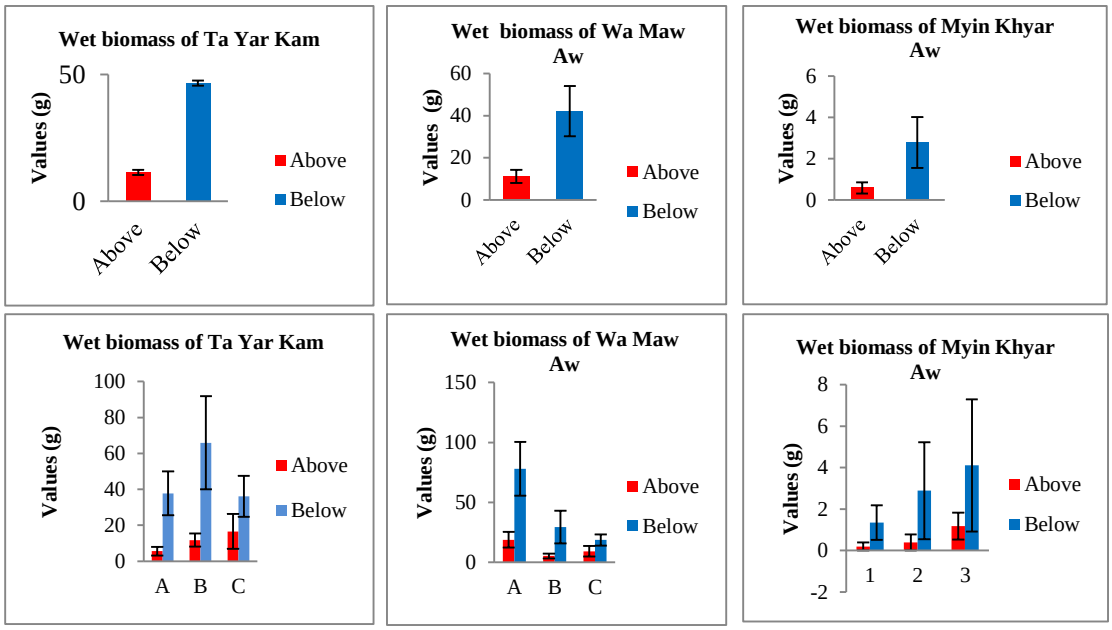
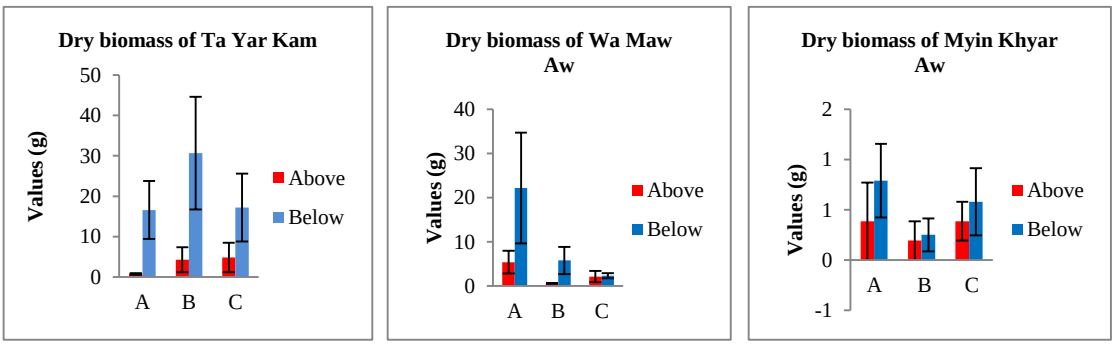


Figure 3 Comparison of the wet biomass of seagrass at 3 different stations during the present study.



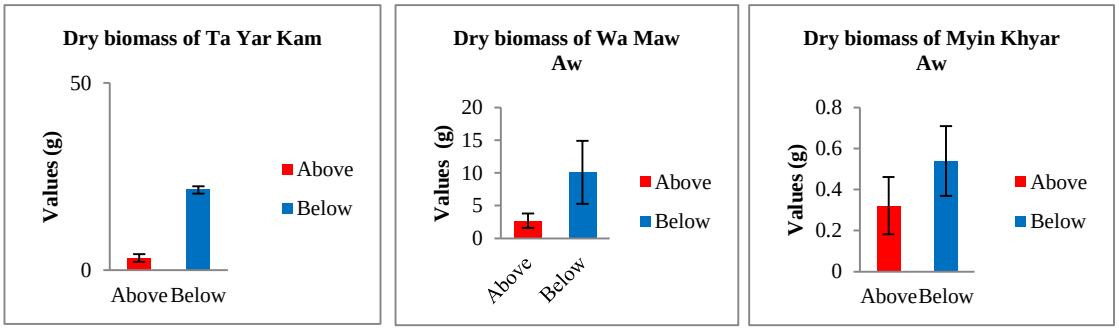


Figure 4 Comparison of the dry biomass of seagrass at 3 different stations during the present study.

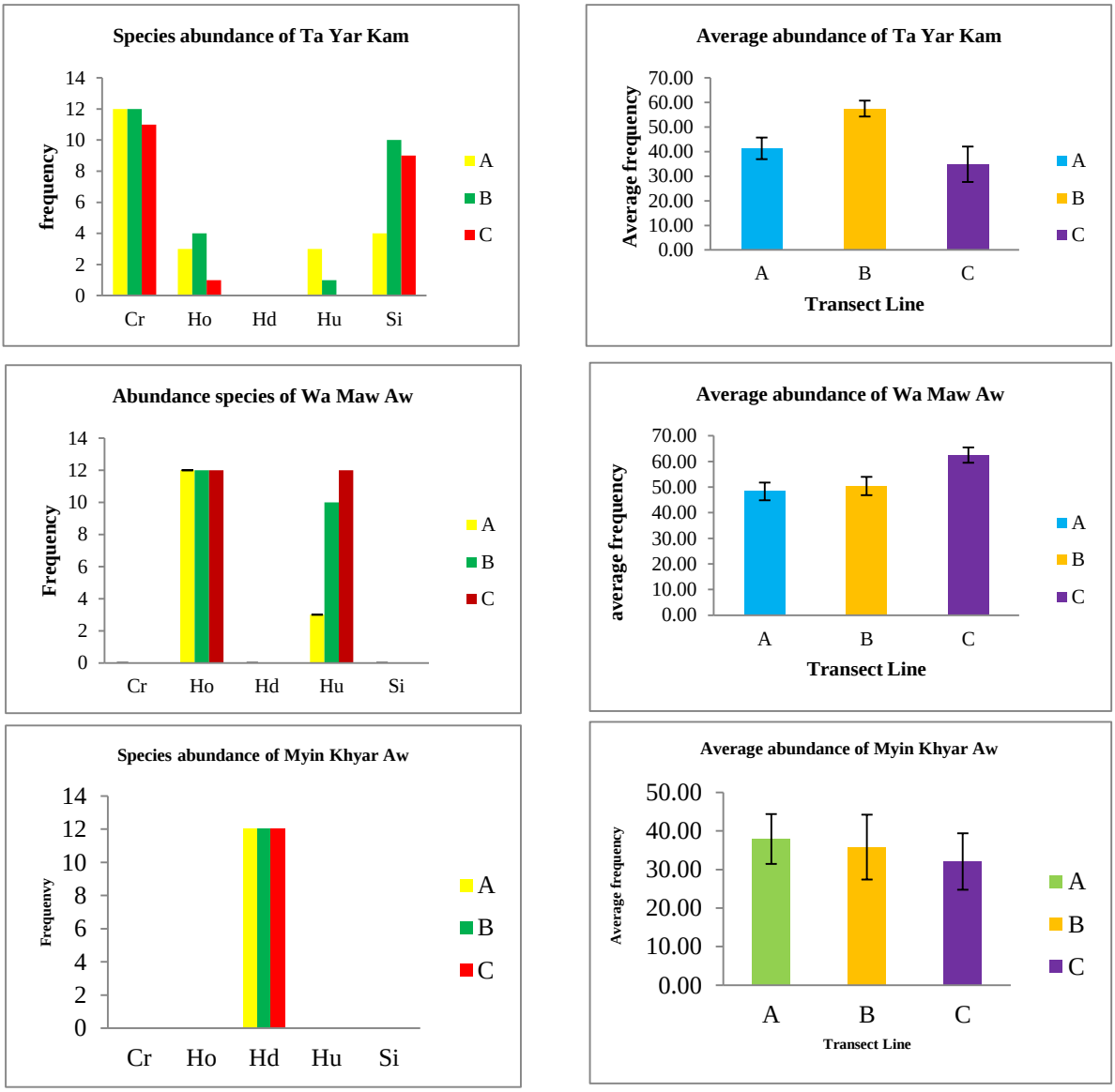


Figure 5 Comparison of the species abundance of seagrass at 3 different stations during the present study.

monitoring of seagrass beds and provides the ability to quantitatively measure the impact of management interventions aimed at seagrass conservation.

Conclusions

In the present study, the seagrasses meadow was larger in Wa Maw Aw and Ta Yaw Kan than Myin Khyar Aw. The seagrasses biomass depends on the species. *Halophila decipiens* favour the mud whereas *Cymodocea rotundata* and *H. ovalis* more grow in the sandy-mud. The salinity and transparency effect to seagrass ecosystem. From the ecological point of view of seagrasses communities were important marine resources due to the nursery and feeding grounds for the marine organisms. This study contributes a baseline result for further study of seagrasses in Myanmar Coastal Areas.

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